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ABSTRACT

This study was conducted to identify the personality characteristics of high achieving developmental, or remedial, students and to discover how personality characteristics relate to academic performance among high-achieving developmental and non-developmental college students to determine if a correlation exists between personality and performance. The personality types of a sample of developmental honor society students (N=38) were compared to those of a sample of non-developmental honor society students (N=75) based on their responses to the Myers-Briggs Type Indicator (MBTI). Findings contribute to the body of research on developmental student characteristics and substantiate previous research that reports personality characteristics contribute and enhance the academic performance of developmental students. Recommendations for further research are included. Appendix A describes the MBTI personality types. Appendix B presents data on XAE Honor Society students; Appendix C, PBK Honor Society students. Appendix D contains data on the MBTI type groups. (HB)

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PERSONALITY CHARACTERISTICS ASSOCIATED WITH ACADEMIC ACHIEVEMENT AMONG DEVELOPMENTAL COLLEGE STUDENTS

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A Dissertation Submitted

by

ALLAN B. HILL

to

The Fielding Institute

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ABSTRACT

Personality Characteristics Associated with Academic Achievement
Among Developmental College Students
by
ALLAN B. HILL

This study was conducted to identify the personality characteristics of high achieving developmental students, and to discover how personality characteristics relate to academic performance among high achieving developmental and nondevelopmental college students to determine if a correlation exists between personality and performance. Specifically, the personality types of a sample of developmental honor society students (N = 38) were compared to those of a sample of nondevelopmental honor society students (N = 75) based on their responses to the Myers-Briggs Type Indicator (MBTI). Chi-square analysis of observed and expected frequencies and a hypothesis test for proportions were used to analyze the data. MBTI type tables containing the frequency distributions, percent of sample, and chi-square calculations with one degree of freedom for both groups are displayed and included. Statistically significant differences were found for 18 of the 44 chi-square calculations. Notably, Sensing (S) types outnumbered Intuitive (N) types by 3 to 1 and were significantly different from the comparison group where Intuitive (N) types outnumbered Sensing (S) types 3 to 1. Furthermore, the Sensing/Judging type group accounted for more than 60% of the developmental sample, and statistically significant differences were reported for both the ISFJ and ESFJ four-letter types. Findings contribute to the body of research on developmental student characteristics and substantiate previous research that reports personality characteristics contribute to and enhance the academic performance of developmental students.

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CHAPTER ONE

Introduction

The problem of students who enter college academically underprepared is so widespread that 81% of public 4-year institutions offer remedial and developmental programs (Maryland Higher Education Commission, 1996). Nearly one-third of entering freshmen enrolled at public campuses nationally require remedial help (Snyder, 1998; Boylan & Bonham, 1992).

Academic remediation is not new to higher education (Boylan, 1987; Brier, 1985). An 1828 article in the *Yale Report* complained about the college's practice of admitting students with "defective preparation" (Maryland Higher Education Commission, 1996), and in 1849 the first developmental program was founded at the University of Wisconsin (Boylan, 1988). By 1900, most of the nation's colleges and universities had adopted the Wisconsin model, and the growth of developmental education at 4-year institutions continued through the 1920s. By the 1930s and 1940s, the establishment and expansion of 2-year colleges initiated a decline in remedial enrollment at 4-year institutions (Boylan, 1988).

During the last five decades, however, higher education has experienced a resurgence of underprepared students. In the 1950s and 1960s massive increases in federal financial aid allowed former servicemen, low-income students, and others greater access to higher education (Boylan, 1988). At the same time, colleges and universities, responding to the federal largess and social equity pressures, adjusted admissions policies

to allow access to students whose prior academic performance would have otherwise kept them out of college.

As in the past, institutions sought ways to accommodate these students by offering an array of services to help remediate their academic deficiencies (Roueche, 1984; Siryk, 1981). Most of these students were labeled at-risk, disprivileged, disadvantaged, under-achiever, low-achiever, non-traditional, learning disabled, high-risk, remedial, basic skills, and most commonly, developmental (Roueche & Snow, 1977).

The modern rise of developmental programs was accompanied by an acute need among practitioners to better understand the students that they served. As a result, the characteristics of developmental students became the subject of intense scholarly interest.

Statement of the Problem

Currently, developmental education practitioners rely heavily on cognitive characteristics to design programs and implement services that promote student development, achievement, and retention (Purvis & Watkins, 1987). Cognitive characteristics, as reflected in academic performance, assess only the *ability* of a student to perform academically (McRae, 1983) and thus, have limited instructive utility for developmental education administrators and staff (White & Sedlacek, 1986). The supplemental use of personality characteristics may assess a student's *willingness* or *motivation* to perform, and assist in designing services that promote academic performance (McRae, 1983; Higbee & Dwinell, 1992).

One method to address the issue of student performance is to study those in colleges who achieve. By investigating the characteristics of college achievers, valuable data can be gained which will better orient educators and practitioners to design services appropriate to the special needs of developmental populations (Kawalski, 1977).

It is the intent of this study, therefore, to identify and compare the personality characteristics of high achieving developmental students with those of high achieving nondevelopmental students to determine if a correlation exists between personality and academic performance. Identification of the personality characteristics of high achieving developmental students will complement existing knowledge of this population.

Definitions

Developmental education: refers to comprehensive programs and services designed to meet the needs of academically under-prepared college students (Payne & Lyman, 1996) and involves providing a wide range of services directed toward the affective and cognitive growth of students (Boylan, Bonham, & Bliss, 1994b); is thus distinguished from remedial education.

Remedial education: refers to academic courses designed specifically to compensate for deficiencies in prior learning (Boylan, 1998) and are often necessary components of developmental education (Boylan, Bonham, & Bliss, 1994b).

Developmental program: refers to the structured organization of comprehensive services designed to provide cognitive and non-cognitive support.

Developmental student: refers to any full-time, degree-seeking individual who has been admitted to a 4-year post-secondary institution whose prior academic performance places them in jeopardy of failure and withdrawal. Throughout the literature these students have been labeled at-risk, disprivileged, disadvantaged, under-achiever, low-achiever, non-traditional, learning disabled, high-risk, remedial, and basic skills (Roueche & Snow, 1977).

Chi Alpha Epsilon (XAE): refers to the national honor society for developmental students.

Achievement: is measured by cumulative grade point average (GPA) at 3.0 or above.

Delimitations

Developmental students are defined as those judged by the local institution's criteria. While the definition of developmental education is widely used and accepted, the specific meaning of the term may vary from institution to institution (Boylan & Bohnam, 1992). Since campuses may assign different meanings to the term "developmental" and often use the terms "remedial" and "developmental" and "high-risk" interchangeably, inter-institutional comparisons should be made with caution.

Sample group participants in the study were limited to those from a mid-sized, 4-year public university located in southeastern Pennsylvania who are members of a national academic honor society. The comparison group sample is limited to those from a mid-sized, 4-year public university in Florida who are members of a national academic honor society.

In addition to limiting the participants in the study, the measurement of academic performance was limited to a cumulative grade point average (GPA) at 3.0 and above on a 4.33 scale for the sample group and at 3.0 and above on a 4.0 scale for the comparison group.

The scope of participant personality characteristics is limited to the interpretation of personality type derived from the Myers-Briggs Type Indicator (MBTI). The MBTI differs from other personality instruments (i.e., trait instruments) in that the theory upon which it is based postulates dichotomies which are believed to reflect innate psychological dispositions (Myers, McCaulley, Quenk, & Hammer, 1998). The trait-type distinction leads to different interpretation of meaning. Thus, conclusions drawn from the results of this study will be limited to MBTI interpretations.

Limitations result from inherent differences in the populations under study. For example, comparison group data were obtained from students who were graduated from a university in Florida and the sample group data from students at a university in Pennsylvania. Thus, differences in geography may be a factor in the outcome of this study. Furthermore, the data for the comparison group were obtained in 1972. The MBTI is normed nationally and has been shown valid over time (Myers, McCaulley, Quenk & Hammer, 1998). Thus, while these limitations should be noted, they are not considered threats to the validity of this study.

Research Question

This research sought to determine the relationship between personality type and high academic performance among developmental students and nondevelopmental college students. Specifically, the study investigated the following hypothesis in null form: There is no statistically significant difference between the personality type characteristics of high achieving developmental and high achieving non-developmental students as measured by the MBTI.

Rationale

The purpose of this study is twofold: The first is to fill a void in the literature through identification of the personality characteristics of high achieving developmental students. Such information will assist developmental program practitioners enhance service delivery, facilitate program development, and promote student retention. The second is to identify a relationship between personality characteristics and high academic performance.

The need for this study is apparent in the literature. McRae (1983) pointed out that a better understanding of the relationships between personality dimensions and academic performance is needed, "because it would be a worthy...goal to define certain non-cognitive dimensions strongly related to academic achievement as predictors" (McRae, 1983, p. 17). Discussing the nature and processes of educational change, Pascarella and Terrenzini (1991) noted that we know comparatively little about how differences in student personality characteristics impact their interpersonal and organizational experiences.

Research indicates that the quality of student experiences prescribes the degree of student persistence and retention (Tinto, 1975, 1987; Astin, 1975, 1972). Thus, references to retention using models of individual differences would have instructive value and functional utility. Furthermore, since individual differences shape both cognitive and affective learning, personality characteristics models would thus serve as a reminder of the need to take these differences into account in academic practices (Pascarella & Terrenzini, 1991).

Past research has examined developmental student characteristics from cognitive (Dunn, 1995), affective (Higbee & Dwinell, 1996), behavioral (Siryk, 1981), and to a lesser degree, demographic (Boylan, 1987) perspectives in an effort to identify traits that would predict or enhance collegiate performance. After years of research, essentially every variable that one can get data for has been examined to see if it might correlate with performance and retention (Godleski, 1994). The decades-long examination of performance variables has produced useful results, but has ignored high academic achievement as a conceivable developmental student performance characteristic.

Previous research has adopted a limited view of developmental student performance, accepting as "successful" a cumulative GPA at or near 2.0 on a 4.0 scale (Bender, 1997; Boylan & Bonham, 1992; Nisbit, Ruble, & Schurr, 1982). This bias is not surprising, given that most all colleges and universities in the United States require a minimum of a 2.0 GPA for matriculating students to be graduated, and that many developmental students are not expected to perform beyond minimum standards. Because of this narrow perspective, scholarly references to exceptional academic

performance among developmental populations are non-existent. This study attempts to fill that void.

As previously mentioned, this study will also attempt to identify a relationship between personality characteristics and high academic performance. An assumption that personality is related to academic performance and that performance is related to college student retention and withdrawal can be inferred from the literature (Tinto, 1975). Mounting institutional concern over student attrition, and legislative pressure to account for the now scarce resources allocated to developmental education, compel developmental practitioners to be sensitive to individual differences as reflected in personality in order to provide meaningful services that promote student performance and persistence (Arendale, 1998).

It is obvious that some students drop out of college. Forty-three years ago, Iffert (1956) noted that close to 50% of those entering college would withdraw prior to being graduated. In 1970, 40% of entering freshmen would depart before reaching their 4th year (Cope & Hannah, 1975; Astin, 1972). Data from the U.S. Department of Education in 1983 indicated that 55% of all students entering 4-year institutions in that year would withdraw from college before receiving a degree. During the same period, the attrition rate for developmental students attending 4-year public institutions was reported to be close to 70% (Boylan & Bonham, 1992).

Since the 1950s little has changed as students, regardless of entry status, continue to leave college in large numbers (Porter, 1990). And, while attrition has been a chronic problem at colleges and universities nationwide, it has now become a matter of economic

survival for many institutions. A shrinking college-aged cohort has meant there is no longer a large pool of entering students to take the place of those who drop out, and dropouts represent lost students and lost revenue (Tinto, 1975, 1987; Astin, 1972; Pascarella & Terrenzini, 1991). Thus, institutional concern associated with student attrition has stimulated considerable interest in the nature and process of student withdrawal.

A particularly noteworthy attempt to explain the attrition process can be found in Tinto's (1975, 1987) model of student departure. His research explains the attrition process in terms of individual differences reflected in student responses to institutional influences. Satisfying and rewarding encounters with the formal and informal academic and social systems of an institution are presumed to lead to greater integration in those systems and thus to student retention (Pascarella & Terrenzini, 1991). Pascarella and Terenzini (1991) elaborated:

> The term integration can be understood to refer to the extent to which the individual shares the normative attitudes and values of peers and faculty of the institution and abides by the formal and informal structural requirements for membership in that community or in the subgroups of which the individual is a part. Academic and social integration may describe a condition (that is, the individual's place in the academic and social systems) or an individual perception (that is, the individual's personal sense of place in those systems). Negative interactions and experiences tend to reduce integration...promoting the individual's marginality and ultimately, withdrawal.

Jung's (1923) theory of personality focuses upon individual differences and thus provides a possible explanation for variations in academic performance and social integration. Jung's (1923) theory was interpreted and given operational expression in the form of Myers-Briggs Type Indicator (MBTI) by Katherine C. Briggs and Isabel Briggs Myers (Myers & McCaulley, 1985; Lawrence, 1996; Pascarella & Terrenzini, 1991). The MBTI is a survey instrument designed to classify individuals in groups based on distinctive differences in personality (Myers & Myers, 1980; Myers & McCaulley, 1985). The instrument groups these differences into 16 personality types. Each particular type has distinctive characteristics that describe certain aspects of human behavior.

Jung (1923) theorized that individual differences result from the interaction between personality and environment, and that apparently random behaviors are attributable to a few basic, orderly and observable differences in mental functioning (Myers & Myers, 1980; Pascarella & Terrenzini, 1991). Myers and Myers, (1980) further explained:

> Basic differences concern the way people *prefer* to use their minds, specifically the way they perceive and the way they make judgments. *Perceiving* is here understood to include the process of becoming aware of things, people, occurrences, and ideas. *Judging* includes the processes of coming to conclusions about what has been perceived. Together, perception and judgment, which make up a large portion of people's total mental activity, govern much of their outer behavior, because perception--by definition--determines what people see in a situation, and their judgment determines what they decide to do about it. Thus, it is reasonable that basic differences in perception or judgment should result in corresponding differences in behavior.

Conversely, basic similarities in perception and judgment should result in corresponding similarities in behavior (Jung, 1923; Myers & Myers, 1980). In an academic environment, performance behavior can be measured using grades and cumulative GPA. Academic achievement, as measured by grades, is assumed a derivative of intelligence and cognitive ability (Astin, 1972; Tinto, 1975). This point of view is based primarily on the assumption that tests of intelligence and standardized measures of cognitive ability are predictive of academic performance (Chase & Jacobs, 1989; Myers, McCaulley, Quenk, & Hammer, 1998). In contrast, Pascarella and Terrenzini (1991) noted that:

> Although heavily influenced by cognitive ability and intelligence, grades in college are not merely a function of those factors. Even with academic ability and intelligence taken into account, grades at the individual level are significantly influenced by such factors as personal motivation, study habits, and the like. As a gauge of successful adaptation to an academic environment, grades tend to reflect not only requisite intellectual skills but also desirable personality characteristics. (Pascarella & Terrenzini, 1991)

As previously noted, functional integration with an institutional environment is a central theme in retention literature (Tinto, 1987; Astin, 1975). According to Tinto (1987), students' background characteristics (personality) affect their level of integration into an institution's academic and social environment, and thus influence their degree completion (Schurr, Ruble, Palomba, Pickerill & Moore, 1997). Pascarella and Terenzini (1991) noted that grades are the single most revealing indicator of a student's successful integration with the collegiate environment. Thus, academic performance as measured by GPA is a strong measure of academic integration (Kalsbeek, 1986). Hence, it is reasonable that students with high

cumulative grade point averages have adapted well with their collegiate environment. Accordingly, the identification of the personality characteristics of high performing students may lead to a better understanding of the attributes of individuals most likely to adapt to a collegiate environment.

Research supports the commonsense notion that academic skill is related to academic performance, and that prior academic performance is predictive of collegiate achievement (Psaros, 1985). These predictions, however, have been made primarily on the basis of results from standardized tests, like the SAT or ACT, and from other so-called traditional measures, like high school grades and class rank. Contrary to prediction, some students who are considered capable of performing on a college level fail; others, who are deemed incapable and labeled "developmental," succeed. Educators have long noticed that the skill to performance correlation does not seem to be a neatly proportioned one (Psaros, 1985). Past research suggests that while traditional measures remain the best performance predictors of nondevelopmental students despite a 50 % failure rate (Stallworth-Clark & Scott, 1996), affective characteristics are critically important variables relating to developmental student performance (Richardson, 1994; Kalsbeek, 1986; White & Sedlacek, 1986; Larose & Roy, 1991).

Pascarella and Terrenzini (1991) stressed the importance of affective characteristics in retention research by noting that greater recognition of personality characteristics would be useful in understanding why students respond differently to their college experiences. Furthermore, evidence from past research indicates that the theoretical models of both Tinto (1975, 1987) and Jung (1923) have been useful for understanding student performance,

persistence patterns, and for improving institutional practices (Pappas, 1998; Baudouin & Uhl, 1998; Schurr, Ruble, Palomba, Pickerill & Moore, 1997; Kalsbeek, 1986). Hence, this study builds on previous efforts in the spirit of McRae's (1983) counsel: "It is not only important to determine those who *can* complete their academic pursuits (academic ability), but those who *will* complete their course of study (personality characteristics)" (p. 37).

CHAPTER TWO

Review of Relevant Research

Developmental student characteristics have long been a topic of scholarly interest (Boylan, Bonham, & Bliss, 1994a, 1994b; Cross, 1976; Cherdack, 1971; Wilson, 1978; Wambach, 1993; Higbee, 1990; Nisbit, Ruble & Schurr, 1982; Tom, 1982; Dunn, 1995; Purvis & Watkins, 1987; Coleman & Freedman, 1996; Richardson & Albright, 1997; Young & Ley, 1997). This chapter will review research on developmental student characteristics and is organized in the following way: (a) Developmental Student Characteristics, (b) Affective Correlates of Pre-College Performance, (c) Affective Correlates of Collegiate Performance, (d) The MBTI, and (e) Review Summary.

Developmental Student Characteristics

As a population of young adults, developmental students are typical of all college students. They are not distinguished from other students by age, ethnicity, nationality, class, or gender. Nor can they be distinguished from their peers by appearance, interests or behavior. Their primary differentiating characteristic is that they are all academically unprepared or under-prepared. In this regard, developmental students possess unique defining attributes. Moore and Carpenter (1987) identified several, including erratic academic performance both in high school and college, unimpressive standardized test scores, low socioeconomic background, low rate of persistence and high withdrawal from

college, depressed motivation, low self-esteem, poor self-concept, unclear goals, and verbal passivity.

Maxwell (1981) described developmental students as those whose skills, knowledge, and academic ability are significantly below those of the "typical" student in the college or curriculum in which they are enrolled. Boylan (1987) pointed out that some developmental students are capable but unmotivated, others are capable but the products of poor school systems, others are motivated but have poor skills, and still others are motivated but not exceptionally capable. Moore and Carpenter (1987) pointed out that many developmental students, contrary to popular perception, are upper-class students who do not carry with them the additional economic and psychosocial burdens typically associated with developmental populations.

In a study conducted by the National Center for Developmental Education for the Exxon Educational Foundation, Boylan, Bonham and Bliss (1994a) examined the effectiveness of developmental education in the United States and identified program activities that contribute to student success. Reporting on information drawn from this larger study, the authors analyzed prior academic achievement, demographic, and persistence and retention characteristics of 5,566 students from 160 2-year and 4-year institutions. Findings revealed that nationwide:

1. The mean age for students at 4-year institutions was 19.
2. Female students comprise 54% of the developmental population.

3. The majority of students participating in developmental education were White (59%), and African Americans were the largest minority in developmental education at 30 %, while Latino participation was reported at about 7 %.

4. Seventy-five percent of developmental students receive financial aid.

The authors also reported that:

1. The mean high school GPA for students at 4- year institutions was 2.58.
2. The mean total SAT at 4-year institutions was 674.
3. The mean cumulative GPA of graduates at 4-year institutions was 2.11.
4. The average retention/graduation rate among students at 4- year institutions was 37 %.
5. African American students are represented in developmental education in greater numbers (30%) than they are in the higher education population as a whole (9%).

SAT scores for developmental students were found substantially lower than the average of 900 for other students; only 19% of developmental students at 4-year institutions had SAT scores above 900. The authors noted that while developmental students may not do well on standardized tests, the reported mean GPA of over 2.0 suggests that these students are capable of performing in college. An additional finding from this study indicates that the attrition rate for developmental students in 4-year institutions closely matches the attrition rate for "mainstream" students (Boylan & Bonham, 1992). The authors concluded that while developmental students are typical of other students in higher education in terms of age and gender distribution, they are, in general, a diverse population with a broad range of defining characteristics.

Affective Correlates of Pre-College Performance

The scope of defining attributes is evidenced in research that has examined an array of demographic, personal and affective characteristics, often in combination with cognitive traits, to determine the ability of these measures to predict college performance. In some of the first such studies, the predictive validity of standardized tests and high school grades were examined (Cherdack, 1971; Eddins, 1978; Tom, 1982; Ervin, Hogrebee, Dwinell, & Newman, 1984; Moore, 1986). These measures were found unreliable predictors of developmental student performance (White & Sedlacek, 1986). Thus, the context for subsequent research that focused on the value of affective attributes was established. Some sought the predictive validity of personality characteristics (Johnson, 1970; Pandey, 1972; Hannah, 1969; Alfert & Suczek, 1966; Stricker, L. J., Schiffman, H., & Ross, J. 1965). Others examined numerous variables associated with personality, such as self-concept (Shreffler, 1975), motivation (Ramist, 1981), anxiety (Hannah, 1971), social integration (Siryk 1981), expectations (White & Sedlacek, 1986), self-esteem (Higbee & Dwinell, 1996), study skills (Robyak & Downey, 1979), and other non-cognitive predictors (White & Sedlacek, 1986). In general, these studies found affective traits to be valuable predictors of developmental student performance. Such findings provided a basis for continued scholarly examination of personality characteristics and overall stimulated broad interest among educators to understand the distinct learning differences between developmental and nondevelopmental college populations.

Larose and Roy (1991) used the Reaction and Adaptation College Test (RACT) to compare the nonacademic dimensions of anxiety, study strategies, beliefs concerning success and motivation of developmental freshmen (N = 926) with those of nondevelopmental freshmen students. The RACT is a 60-item test designed to measure anxiety, motivation, study skills, and students' beliefs about success. The authors hypothesized that high school GPA would be the best predictor of success for nondevelopmental students, whereas nonacademic variables would be the most reliable predictors of the success of developmental students. Multivariate analyses were used to determine the predictive value of nonacademic attributes in combination with high school GPA. Achievement was measured by the ratio of the number of courses passed to the number of courses taken. Results support their hypothesis and indicate that past academic record is less predictive in the case of developmental populations. Results also indicate that personal characteristics such as fear of failure, anxiety, and associating success with facility, are more reliable performance predictors.

Robyak and Downey (1979) examined the predictive effect of the MBTI and selected variables on the performance of students in a developmental study-skills course. Previous academic achievement, personality type, and study skills and habits were analyzed from a sample (N = 61) of college students. The authors reported no difference between personality type as measured by the MBTI and level of previous academic achievement with respect to cumulative grade point average in either the second or third term after the course ended. Contrary findings were reported by Nisbet, Ruble an Schurr (1982) who examined prior academic performance, the effectiveness of the MBTI, the

Effective Study Test (EST), the Nelson Denny Reading Test (NDRT), and the Holland Vocational Preference Inventory (HVPI) in predicting college academic success among developmental college students (N = 658) at Ball State University. The NDRT and the EST were administered over a 10-week period during a summer orientation program for incoming freshmen. The MBTI and the HVPI, which were not required of students to take, were administered just prior to the beginning of the fall semester to 533 of the original 658 students. Multiple regression techniques were used to analyze the data. The authors reported that the combination of the EST, high school grades, and MBTI showed a positive correlation with academic achievement as measured by second quarter cumulative GPA. Of particular significance are the findings regarding personality type. The authors noted that a measure significant in improving the prediction of GPA and, perhaps, the explanation of achievement, was the judging -perception (JP) scale of the MBTI. Type theory postulates that the JP preference is associated with an individual's orientation to the outside world. The authors further noted that although the use of the MBTI (along with the other measures) resulted in only a moderate correlation (16%) with academic achievement, its contribution seems to warrant further use to promote academic achievement. The conflicting results obtained from both studies may be due, in part, to the use of a variety of instruments and methodology. The results, however, demonstrate the need to know more about how personality influences academic performance.

In a study that compared developmental (N=36) and non-developmental (N=39) women, Kanoy, Wester, and Lotta (1989) examined SAT scores and high school GPA, along with affective variables to predict first-year GPA at Peace College. Three

instruments were used in this study to determine the effect of affective variables on academic performance: the Learning Context Questionnaire (LCQ), which measures self-reported perceptions of academic ability; the Academic Self-Concept Scale (ASCS), which measures confidence levels; and the Multidimensional-Multiattributional Causality Scale (MMCS,), which measures locus of control. Stepwise multiple regression analyses were performed to predict the GPA of both groups. Two affective variables, (taking responsibility for achievement success and effort) were found to account for 46% of the variance in GPA for the developmental group. The authors reported that high school GPA and academic self-concept predicted 56% of the variance in college GPA in the non-developmental group, and that neither of these variables was effective in predicting freshmen GPA among the developmental sample. The authors concluded by suggesting that the combination of affective and cognitive variables produce the best prediction model. These findings support the notion that non-cognitive variables are likely to predict developmental student performance more reliably.

Multiple regression analysis techniques and a variety of instruments have been used to examine the predictive validity of affective variables. It appears from the results of theses studies that personality variables are important factors in predicting the academic performance of developmental students.

Affective Correlates of Collegiate Performance

There is a significant amount of research supporting the notion that personality is an important factor in collegiate performance (Brown & DeCoster, 1991; Apostal &

Trontvent, 1989; Kalsbeek, 1986; Burns, 1985; Coleman & Freedman, 1996; Kalsner, 1992; Mealey, 1990; Williams, Morris, Newman, & Williams, 1989).

When Astin (1975) and Tinto (1987) emphasized the value of personal characteristics and "environmental fit" as critical factors in student retention, research on traits that influence academic performance among developmental students became more widespread. Accordingly, scholars set out to identify affective characteristics that would most likely contribute to student performance and increased persistence. Thus, scholarly interest in student performance characteristics was reflected in the examination of variables associated with personality, such as learning styles (Drummond & Stoddard, 1992), anxiety (Chapin, 1989), person-environment fit (Kalsbeek, 1986), locus-of-control (Kalsner, 1992), self-esteem (Higbee & Dwinell, 1996), study skills and habits (Robyak & Downey, 1978), and self-efficacy (Peterson, 1993).

An important academic performance area of study found in the literature examines what students believe about themselves. For example, Wambach (1993) examined the attribution of success or failure of developmental college freshmen (N= 29) who made the Dean's list their first semester. The purpose of this study was to explain the achievement behavior of students who attended an open admission college of a major research university. Fifty-nine subjects were randomly selected from the Dean's list after having achieved a 2.8 or higher GPA their first quarter in college and invited to participate in the study. Of the 59, 19 students completed Weiner's Attributional Theory of Motivation (ATM) survey. The ATM is based on Weiner's theory that suggests that ability, effort, task difficulty, and luck can be used to explain success or failure at a task.

Content analysis revealed that these students attributed their previous academic troubles to a lack of effort and motivation rather than an absence of skill or ability. Wambach (1993) noted that achievement performance derives from a change in students' attribution of low ability, and concludes that retraining students to view learning situations from a "performance goals" point of view may be useful for developmental students. Support for this conclusion comes from Hunter (1993) who reported that when developmental students (N = 150) in a Canadian university were exposed to attributional retraining, course motivation increased and final grades in a psychology course improved. Participants in this study received attributional retraining that involved viewing videotape in which senior students discussed how changing the way they thought about failure experiences improved their performance. Hunter (1993) noted that attributional training is one specific approach that has been demonstrated to improve academic performance for developmental students who are defined either by low academic success or low perceived success, and states that improved student academic performance results from intervention techniques that reduce or alleviate the negative consequences of past failure.

Confirmation also comes from El-Hindi and Childers (1996) who investigated the academic performance and perceived attributions of success for a sample of 78 developmental students enrolled in an academic support course. All participants in the study had GPAs of less than 2.0 and were thus at risk for completing their programs. The authors reported using situation-specific questionnaires to assess participants' metacognitive awareness and attributions for successful or unsuccessful academic outcomes. The underlying attribution dimension studied was controllability. The authors

indicated that metacognitive awareness gains may be realized for students exposed to instruction in academic study skills and reported a significant correlation between metacognitive awareness and attributions of successful performance. The authors reported that while students attributed academic success to note taking and attending class, they did not attribute their failures to the lack of these activities. The authors' findings suggest the need for training in metacognitive awareness and attribution training within academic support courses.

Reading is an obvious part of the collegiate experience and essential to collegiate academic performance. Metacognitive awareness consists of students' knowledge about elements of the reading process and has been shown to have an effect on developmental student performance (El-Hindi, 1997). Research has demonstrated that successful developmental college students have metacognitive abilities, while unsuccessful ones do not (Wade & Reynolds, 1989). Stallworth-Clark and Scott (1996) examined the combined effect of student characteristics and instruction method on performance as measured by grades in a mandatory reading/study skill class. Students with reading and learning strategy training were reported to have earned the highest GPA in subsequent core curriculum courses. However, the authors found that developmental student metacognitive awareness of reading requirements for college and their effect toward learning in college appeared to have little effect on their performance. The authors also reported that teaching method contributed statistically significant variance to student grades with a small effect on GPA in subsequent reading classes.

Collegiate performance has also been linked to individual locus of control (Schonwetter, 1993; Kalsner, 1992). Cartledge (1985) utilized the Rotter Locus of Control Scale (LOCS) to compare the locus of control of developmental (N = 88), graduate (N= 62), and undergraduate (N= 69) students at the University of Georgia. The LOCS differentiates individuals based on their perceptions that outcomes in life are due primarily to forces within their control (internal) or to factors beyond their control (external). The author used two- and three-factor analysis of variance and found that students who worked full-time, those over 25, and graduate students had significantly more internal locus of control, and that the most significant difference in locus of control occurred on the basis of student type, that is, developmental students were significantly more likely to have an external locus of control.

Developmental student performance in college courses may be determined, in part, by their style of learning. Learning styles are ways of processing information that are intimately interwoven with the affective, temperamental, and motivational structures of the human personality (DiTiberio, 1996). Learning style assessment can provide the basis for individualized approaches to instruction, student advisement, and evaluation of learning.

Several studies relating learning style to academic performance are reported in the literature (Lawrence, 1996; Cooper & Miller, 1991). Cano (1998) examined the relationship between learning style, academic major, and academic performance of Ohio State University students (N=178) in a longitudinal study using the MBTI and Group Embedded Figures Test (GEFT) to assess learning style. The performance criterion was

cumulative grade point average (GPA). The MBTI scales of perception (Sensing / Intuition) and scales of judgment (Thinking / Feeling) assess learning style according to MBTI theory. GEFT field dependence and independence designations were related to the MBTI scales with Feeling (F) associated with field dependence and Thinking (T) associated with field independence. Thus, the combinations of SF, NF, ST, and NT were used to describe learning style. Data analysis was conducted using Pearson correlation coefficients to relate learning style and ACT scores, learning style and GPA with an alpha level set at .05. Findings indicate that 56% of the respondents reported being field independent (ST/ NT) and 44% of the sample reported field-dependent (SF / NF) preferences. Cano (1998) reported a mean GPA of 2.45 for the sample, with 43% of field dependent students and 67% of field independent students above a 2.45 GPA. The author also reports positive and significant relationships between learning style and ACT scores, ranging from low ($r = .25$) for ACT reading, to substantial ($r = .51$) for ACT math. The author indicates that the positive relationships show that as learning style score increased (the more ST / NT), an increase was noted in ACT score and GPA. The author concludes that the structure utilized in higher education tends to favor field independent (ST / NT) learners and recommends early identification of student learning styles.

The notion that variations in learning style may be based on a student's preference for use of one hemisphere of the brain more than another has reinvigorated interest in the influence of style differences on academic performance. Like personality type, hemispheric preferences -- an individual's greater reliance on one style of hemispheric cognitive processing over another -- are manifested educationally (Hylton & Hartman,

1997; Taggert, Kroeck, & Escoffier, 1991). Hylton and Hartman (1997) examined the personality, hemispheric dominance, and cognitive style of medical students (N =154) and undergraduate students (N= 526) at a small New England university using the Hemisphere Mode Indicator (HMI) and the MBTI. The purpose of the study was to determine a relationship between brain hemisphere dominance and personality type in order to understand student learning styles to assist students in becoming learners who are more efficient. The authors note that the HMI descriptors that classify a person as right-brained or left-brained have psychometric affinity with the S-N and J-P scales of the MBTI. This was determined by the authors using multiple regression to test for instrument interaction and MANOVA for each scale of the MBTI. Results indicate that SJ and NP students are likely to be left- and right-hemisphere dominant respectively. The authors conclude by suggesting that educators and learning specialists be sensitive to the related preferential processing needs of such students. The authors also indicate that this is particularly important with developmental students, who are not sophisticated learners and are thus, often not aware of the necessity or the means of making modifications to support their preferred styles of learning.

Methods used by students to process information --their learning styles -- affect the way they study. In an effort to find a predictive model of study skill characteristics, Bender (1997) compared faculty perceptions of academic behaviors and the GPA of developmental (N = 22), nondevelopmental students (N = 30) and a control group (N = 21). The author sought to determine if faculty could discern differences in developmental student's academic behavior as a result of the students' participation in the College Skills

Development Program (CSDP), a mandatory study skills course with required attendance at tutoring sessions. The nondevelopmental comparison group was voluntarily enrolled in a study skills course and was not required to attend tutoring sessions. Bender (1997) found that the developmental group, exposed to study skills programs and class-specific academic tutoring, had the best academic performance as measured by cumulative GPA, and that faculty reported a greater number of positive behaviors on the part of these students in their classes. Findings support the inclusion of study skills programs and mandatory tutoring in developmental programs to promote academic achievement.

The MBTI

The MBTI is concerned primarily with variations in normal behaviors and attitudes, and has been used since 1975 in a wide variety of applications, including individual counseling and psychotherapy, career counseling, improving teacher-student interactions in education, leadership development in organizations and management, and improving interpersonal relations in multicultural settings (Myers, McCaulley, Quenk & Hammer, 1998). The purpose of the MBTI is to identify individual preferences with regard to perception and judgment.

Jung's (1923) theory of personality is the theoretical foundation for the MBTI that classifies individuals on each of four dimensions (Myers & McCaulley, 1985):

Extraversion or Introversion	(E-I)
Sensing or Intuition	(S-N)
Thinking or Feeling	(T-F)
Judgment or Perception	(J-P)

Each dimension is conceptualized and graphically represented as a dichotomous scale with zero as its midpoint. The eight distinct preferences that are defined in the MBTI are not traits that vary in quantity; rather, they are dichotomous constructs that describe equally legitimate but opposing ways in which we use our minds (Myers, McCaulley, Quenk, & Hammer, 1998). Type theory postulates that much seemingly random variation in human behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment (Myers, McCaulley, Quenk, & Hammer, 1998). Further, type theory assumes there are four basic mental processes (Sensing, Intuition, Thinking, and Feeling) used by everyone to perceive and to judge, but each is not equally developed or preferred (Myers & Myers, 1980). MBTI respondents receive a score on each scale that indicates the strength and direction of their dominant preference. Type is then derived from the preferences identified on the scale. The resulting combination of preferences form 16 different personality types (Appendix A). For example, an expressed preference for Extraverted, Intuitive, Thinking, and Perceiving would result in an ENTP type, according to the theory. Preferences or types are understood to be dynamic, not static, and unique for each individual, hence there are no right or wrong types (Lawrence, 1996). A brief description of each of the four dichotomies and the way in which the 16 types are determined is given here to facilitate understanding of the MBTI terminology that will be used throughout the study. The main objective of the MBTI is to identify which of two opposite categories is preferred on each of the four dichotomies. The letters E or I, S or N, T or F, and J or P are used to designate which of the opposite sides of a respondent's nature are preferred.

The E vs. I dichotomy indicates a person's preference for Extraversion (E) or Introversion (I) in the sense intended by Jung. Extraverts are oriented mainly toward the outer world of people and things. Introverts direct energy more toward the inner world of concepts and ideas. According to Jung, both orientations are mutually valuable ways of directing one's perception and judgment.

The S vs. N dichotomy measures a person's preference between two distinct ways of perceiving, namely, Sensing (S) and Intuition (N). Sensors focus primarily on what can be perceived by the five senses. Those preferring Intuition focus mainly on less obvious means of perception attending to meaning patterns, possibilities, and relationships in a subconscious manner (i.e., insight).

The T vs. F dichotomy reflects a person's preferences between two distinct and contrasting ways of making a judgment. A Thinking (T) preference indicates a tendency toward impersonal decisions based on facts and logical consequences (i.e., objectivity). In contrast, a Feeling (F) preference reflects an inclination toward decisions made because of personal or social values with a focus toward understanding and harmony (i.e., subjectivity).

The fourth dichotomy, J vs. P, was believed by Myers and Briggs to be implicit in Jung's theory but not explicitly expressed in his writings. The J vs. P preference describes the attitude a person takes toward the outer world, or the extraverted part of life. A Judging (J) preference indicates a person's tendency toward using either Thinking or Feeling (the Judging processes) for confronting the outer world. Characteristic Judgment (J) attitudes are reflected in concerns for making decisions, settling matters,

and seeking closure. For Thinking-Judging (TJ) types, decisiveness is derived from logical analysis; for Feeling-Judging types (FJ), decisions and plans are more apt to be made because of subjective factors. For all persons who prefer Judging (J), perception tends to end as soon as they have observed enough to make a decision. Persons who prefer Judging often seem in their outer goal-oriented behavior to be organized and decisive. It is important to note that Judgment in this sense refers to the process of decision-making and does not imply being judgmental.

On the other hand, a person who prefers a Perception (P) process tends to use Sensing (S) or Intuition (N) (the perceiving processes) when confronting the outer world. A Perception preference indicates an inclination for flexibility and spontaneity, and persons who prefer perception appear in their outer behavior to be adaptable and curious. Persons who have a Sensing-Perception (SP) preference tend toward processing information in terms of immediate reality; Intuitive-Perception (NP) types, on the other hand, tend to process information in terms of new possibilities. Both SP and NP types withhold decision-making in order to obtain more information and new perceptions. Myers, McCaulley, Quenk and Hammer (1998) referred to the Extraversion (E), Introversion (I) and Judging (J), Perception (P) dichotomies as *attitudes* or *orientations*; and the Sensing (S), Intuition (N) and Thinking (T), Feeling (F) dichotomies as *functions* or *processes*. These distinctions appear in the literature associated with a variety of learner characteristics that tend to support theory predictions. For example:

> **Extraverted** (E) types were found to exhibit a concrete experiential learning style; **Introverted** (I) types are reported to exhibit a reflective observational learning style. **Sensing** (S) types are reported to have a

> sequential learning style, be collaborative, high in fact retention, and be left-brain hemisphere learners. **Intuitive** (N) types are reported to exhibit a concrete random learning style, be visual and auditory, high in reflective judgment, and be right-brain hemisphere learners. **Thinking** (T) types are reported to be abstract sequential, and left-brain hemisphere learners. **Feeling** (F) types are reported to be abstract random, and holistic learners. **Judging** (J) types are concrete sequential, and left-brain hemisphere learners. **Perceiving** (P) types are abstract random, and right-brain hemisphere learners, (Myers, McCaulley, Quenk, & Hammer, 1998)

Sensing (S) - Intuition (N) and Thinking (T) - Feeling (F) represent the four mental functions according to the MBTI theory (Myers & Myers, 1980). Type theory states that the four functions direct conscious mental activity toward different goals:

- Sensing (S) seeks the fullest possible experience of what is immediate and real.
- Intuition (N) seeks the furthest reaches of the possible and imaginative.
- Thinking (T) seeks rational order in accord with the impersonal logic of cause and effect.
- Feeling (F) seeks rational order in accord with the creation and maintenance of harmony among important subjective values (Myers, McCaulley, Quenk & Hammer, 1998):

Type characteristics are assumed to stem from the preferred use of the four mental functions that are often viewed as learning styles or cognitive styles. Thus, meanings derived from function pairs have particular significance for education in general and developmental learners in particular.

Consequently, the MBTI has been used extensively in higher education research (Giovannoni, 1989; Godleski, 1994; Nisbit, Ruble, & Schurr, 1981; Schurr, Ruble, Palomba, Pickerill & Moore, 1997; Van, 1992). The Center for Applications of Psychological Type (CAPT) database lists over 3,000 citations of research that have used the MBTI in higher education. Lawrence (1996) noted that over 130 studies using the MBTI relate type to learning preferences. Provost and Anchors (1987) reported widespread use of the MBTI in a variety of disciplines including career development, academic advising, counseling, learning styles, and development of retention strategies.

Spann, Newman, and Mathews (1991) analyzed the relationships between MBTI type groups, GPA, retention, and choice of major in an evaluation study of 309 developmental students at the University of South Alabama. The purpose of the study was to analyze variables that would assist curriculum and advising revisions. The authors found significant relationships between ES learners, GPA, and retention, and concluded that more data are needed to examine the relationship between type and choice of major. Since the sample was not compared to the total university population, the authors pointed out the possibility that the overrepresentation of ES types may simply be a reflection of the type makeup of the general population. This is supported by evidence reported by Myers and McCaulley (1985) who found that many more students, in general, are ES types. While ES types are more numerous, they are also more likely to have lower average grades than other types as shown in research by Schurr and Ruble (1986). It is interesting to note that in that study, developmental students who were ES types had a relatively higher mean GPA when compared with other types. The study also reported

that IS types, who are said to be extremely stable and consistent (Myers & Myers, 1980), were retained at a higher rate than other types. The authors suggested adapting curriculum to include a variety of instructional techniques to accommodate a range of learning preferences.

Pappas (1998) conducted a study at Creighton University to determine the type distribution of 459 developmental students enrolled in an academic success course from 1990 to 1997. The aim of the study was to describe the broad use of the MBTI, particularly for developmental populations, in the areas of counseling, tutoring, and advising. Further, the study suggests using the MBTI for assisting students in understanding themselves, their learning preferences, and those of their peers. Results indicate a positive relationship between the effects of the course on grade point average and retention over the 8-year period that data were collected. Findings also show more ES (N=145) types than any other (EN = 142; IS = 94; IN = 78). There were approximately twice as many Extraverts (65%) as Introverts (35%), a near equal number of Sensing (52%) and Intuitive types (48%), and Perceiving (60%) types outnumbered Judging (40%) types. It is interesting to note that across 8 years, this sample of developmental students (N= 459) exhibited a remarkably even frequency distribution across all types, except for ENFP (17%), the modal type. Type theory predicts that Sensing (S) types would be overrepresented in such a sample primarily because of their poor performance on standardized tests. The presence of an almost equal number of intuitive types suggests that this developmental sample may be different in terms of pre-college performance and academic preparation. It may also be due, in part, to the

character of the institution and its student recruitment process. This is likely, since Creighton University identifies itself as a "pre-professional" school that prepares students for careers in law, medicine, and pharmacy. Arguing for the use of the MBTI in institutional retention practices, Godleski (1994) noted that a major benefit of having MBTI data is that it allows educators to quantify what has long been known, that each institution has definite personalities and its student body differs in ways of learning.

How we learn is determined by a combination of factors, including our personalities, the ways in which we process information, our social-interactional preferences, and our instructional preferences (Claxon & Murrell, 1987). For example, Carrell and Monroe (1993) examined the relationship between individual learning styles and performance on writing tasks in University of Akron college students (N= 87) in three different composition classes: basic writing, 1st level composition, and English as a second language. Three writing samples were taken over the course of a semester, and each student completed the MBTI. The authors report that results from composition length and syntactic complexity measures indicate that positive correlations on the MBTI may have been the effect of basic compatibilities between the processing styles of students and the methods of writing instruction to which they had been exposed, and that negative correlation may have been the effect of such incompatibilities.

Van (1992) claimed that knowledge of student learning characteristics by teachers and counselors is an important factor in developmental student retention. The study reports that the INTJ student is more likely to be successful in a conventional school setting, citing the tendency for most collegiate environments to favor Intuitive learning

styles. The author points out that ES types are thus particularly disadvantaged in a similar setting. Thus, this finding suggests that institutional sensitivity to the learning styles of Sensing (S) type students is critical for their academic survival. This study supports the notion of teacher-student learning style congruence. It also supports previous research findings that indicate certain personality types outperform others because of compatible teacher-student interactions.

Guidin, Hooker, and Shank (1994), in a study of developmental math and communication students (N=44) at Valencia Community College, found teacher-student style incompatibility to be an important factor in the performance and retention of developmental students. Using Selection Ratio Type Table (SRTT) analysis, the authors found significant differences between student and faculty type distributions. Sensing (S) students (76%) outnumbered Intuitive (N) students (24%) by 3 to 1, which is expected. Among the faculty, Intuitive (N) types (83%) outnumbered Sensing (S) types (17%) by more than 4 to 1. Findings suggest that these students are further disadvantaged because they are likely to encounter professors in their weakest subject areas whose dominant type is incompatible with their own. As concern over poor academic performance and rising attrition increases, these findings indicate that style incompatibility may be an important factor in the academic performance and retention of developmental students.

The MBTI has been used in institutional practices to improve retention and promote academic performance (Kalsbeek, 1986). For example, In a 3-year longitudinal retention study, Godleski (1994) used the MBTI, a 58-item questionnaire, prior academic performance, and demographic variables to develop a characteristics profile of

developmental students for institutional use. The sample (N = 257) included both developmental and nondevelopmental freshmen students attending Valencia Community College. The questionnaire asked students such questions as why they went to college, how they feel about themselves, and what their concerns are. The author reports MBTI preference scores mirrored what other studies have found; 58% of Introverts (I) were retained compared to 44% of the Extraverts (E); 55% of Intuitives (N) survived compared to 46% of the Sensing (S) types. Judging (J) types (54%) outperformed perceptive (P) types (47%).

Developmental students in the sample (N = 62) experienced a 69% rate of attrition after 3 years. Responses to the survey questions varied, with 60% of the developmental students predicting their departure because of a reported perception of insufficient academic preparation. The author reported that the results of this study were used to develop a university-wide freshman orientation course and identifies three areas in which the MBTI proved valuable: teaching and learning style interaction, career orientation, and student-to-student interaction. The author also argues in favor of identifying the characteristics of developmental students in order to enhance institutional interventions to promote persistence and retention. Findings support the use of affective factors as predictors of performance.

The academic performance of developmental students, like all students, is generally viewed in terms of grades or cumulative grade point average. Thus, the literature reports findings that have related personality characteristics to performance, with GPA as the criterion in order to uncover variables that contribute to or enhance

collegiate performance. The preferred method for such examination appears to be a survey questionnaire or personality instrument. From the results of these studies, it appears that personality characteristics have an effect on developmental student performance.

MBTI Reliability

Validity and reliability studies for the MBTI abound (Murray, 1996; Girelli & Stake, 1993; Barbuto, 1997). Reliability data for the MBTI typically include measures of internal consistency and test-retest reliabilities of the separate scales and type classifications. While efforts to establish the reliability and validity of the MBTI have produced mixed results (Gardner, 1996) the large majority of evidence suggests that the instrument is both reliable and valid. Carlyn (1977) reported that the estimated reliabilities of type categories appear to be satisfactory, and that split-half reliabilities of continuous scores exceed .75 for each scale. In a review of the MBTI, Gardner (1996) reported that while dichotomous scores tend to yield lower reliabilities, test-retest reliabilities for continuous scores usually exceed .70 and often surpass .80. While many have found evidence to support the structural properties of type theory, others (McCrae & Costa, 1989; Pittenger, 1993) have expressed concerns about its factorial, criterion-related and construct validity (Gardner, 1996). Two early reviews of the MBTI found in the Sixth Mental Measurement Yearbook (Mendelsohn, 1965; Sundberg, 1965) cite limitations of the instrument and suggest caution when using the inventory. Both authors, however, indicated that the instrument had promise and encouraged its use.

DiVito (1985) pointed out that the absence of normative data for continuous scores limits use of the MBTI, but also reported satisfactory levels of reliability and validity. In another review, Coan (1978) reported that the instrument fairly represents the Jungian types but needs further refinement, particularly with respect to item content; "on the whole the inventory merits further research and use" (p. 630). In a comprehensive review of the MBTI, Gardner (1996) cited research findings that support and review the conceptual foundations and psychometric properties of the instrument and reported sufficient reliability and validity evidence to support the use of the instrument. Carlyn (1977) reported that the MBTI appears to be a reasonably valid instrument that is potentially useful for a variety of purposes.

Summary of Literature Review

When scholars began the study of developmental student characteristics, most research focused on identifying reliable predictors of academic performance. Since performance was assumed to be determined largely from assessments of ability based on traditional measures like standardized tests and high school grades, developmental student achievement was not expected, nor clearly understood, and thus gave rise to considerable speculation. Nontraditional measures were found by many authors to be the most valid predictors of academic success for developmental populations. Their conclusions suggest that college success cannot be determined by academic, or cognitive, variables alone.

The use of affective variables to predict and influence the performance of developmental students is now well established in the literature. Overall, findings from prediction research support the use of personality variables with developmental populations, as these factors, it appears, may be related to academic performance. In particular, it appears that certain personality traits are positively related to academic performance. While information about personality traits is important for understanding student performance, its usefulness appears limited because trait data merely provided information about a singular aspect of human behavior. The literature on type classification, on the other hand, appears to provide information on a broad range of attributes possessed by a person or *group* of a certain type. Thus, type classification permits comparisons to be made among persons of different or similar types and therefore, has the potential to be more useful in understanding relationships between personality and performance. The literature on type and performance, while inconclusive, suggests that certain personality types are likely to perform well in college.

The literature on developmental student characteristics is vast. Despite its breadth, and because high academic achievement is not expected among developmental populations, scholarly references to exceptional academic performance are practically non-existent. This study contributes to the literature by filling that void.

CHAPTER THREE

Method and Procedures

The purpose of this study is to compare the personality characteristics of developmental students and nondevelopmental students who have exhibited above-average academic performance in college. This section will describe the research and methodology to be used in the study, including sample selection, instrumentation, and data collection and analysis.

Research Design

This study is of quantitative design and employed primary and secondary survey data to determine if a correlation exists between personality characteristics and academic performance. Specifically, this study compared the personality characteristics of high-performing developmental and non-developmental students using the Myers-Briggs Type Indicator (MBTI) survey. The use of surveys is particularly useful in comparisons, as they offer the possibility of making refined inferences and assertions about similarities or differences in characteristics, attitudes, or behaviors (Babbie, 1998).

Both the quantitative design and the emphasis on personality characteristics and academic performance are important. The language of quantitative research is a language of variables and relationships among variables (Neuman, 1994). Thus, the central aim of this study--to ascertain a correlation between personality characteristics and academic performance--is best attained via quantitative design. In this inquiry, the concept "personality characteristics" was made operational by MBTI type and thus, represents the

independent variable. The concept "academic performance" is operationalized as cumulative grade point average (GPA) at 3.0 and above and is the dependent variable.

Population and Sample

A mid-sized state university in the Northeast offers a very attractive opportunity to examine the characteristics of high performing developmental students. Developmental students are admitted to the university's Academic Development Program (ADP) to facilitate their academic and social transition from high school to college. All ADP students are admitted on the condition that they attend a 6-week, intensive remedial academic program. One hundred thirty students are selected for the summer program from an applicant pool of about 800 high school applicants and represent about 3.5% of the total undergraduate population. Most are from the southeastern part of Pennsylvania, which includes the Philadelphia metropolitan area. Many of the ADP population are first-generation college students. All have low high school grade point averages and class ranks, and most have scored poorly on standardized tests, such as the SAT or ACT.

Approximately 15% of the 330 currently matriculating ADP student population are selected for membership and inducted in Chi Alpha Epsilon (XAE), a national honor society open only to developmental students. Students who are members of XAE are students who have distinguished themselves by achieving a 3.0 or better (on a 4.33 scale) cumulative GPA over two consecutive semesters. The organization was founded at West Chester University, and the ADP members represent chapter Alpha. The target

population for this study will consist of all members of XAE. Thirty-eight students participated in the study.

Instruments

Two instruments were used to collect data. The first instrument was a brief personal information questionnaire that identified the participant's name, age, gender, ethnicity, enrollment status, and academic major. The second instrument was Form "F" of the Myers-Briggs Type Indicator (MBTI), a 166-item, forced-choice survey based on Jung's (1923) theory of psychological type.

As previously mentioned, the MBTI is concerned primarily with variations in normal behaviors and attitudes and has been used since 1975 in a variety of applications, including individual counseling and psychotherapy, career counseling, improving teacher-student interactions in education, leadership development in organizations and management, and improving interpersonal relations in multicultural settings (Myers, McCaulley, Quenk, & Hammer, 1998). The purpose of the MBTI is to identify individual preferences concerning perception and judgment.

Jung's (1923) theory of type states that apparent random variation in human behavior is not random at all, rather, orderly and consistent due to fundamental differences in the way people choose to use their perception and judgment (Myers & Myers, 1980). Perception includes the various ways of gathering information or becoming aware of things or ideas. Judgment includes the ways in which conclusions are drawn based on what has been perceived.

The MBTI contains four distinct dichotomous scales. Each scale reflects one of four basic preferences, which, according to Jung's theory, direct the use of perception and judgment. That is, individual preferences affect what one attends to as well as how one draws conclusions about what is perceived. The four dichotomous scales are:

Extraversion	(E)	vs.	Introversion	(I)
Intuition	(N)	vs.	Sensing	(S)
Thinking	(T)	vs.	Feeling	(F)
Perceiving	(P)	vs.	Judging	(J)

The main objective of the MBTI is to identify which of two opposite categories is preferred on each of the four dichotomies. The letters E or I, S or N, T or F, and J or P are used to designate which of the opposite sides of a respondent's nature are preferred.

When all four preference scores have been calculated, the type formula is determined, which consists of one letter for each of the four scores (E or I, S or N, T or F, J or P). The four letters (e.g., ENFJ) define type structure. Characteristics of the type are derived from its separate preferences and the postulated interactions between them based on Jungian theory and decades of research and observation by Myers.

There are 16 possible combinations of preferences, each describing a different personality type indicated below:

ISTJ ISFJ INFJ INTJ

ISTP ISFP INFP INTP

ESTP ESFP ENFP ENTP

ESTJ ESFJ ENFJ ENTJ

Validity and Reliability

The MBTI was selected because of its reliability and validity as reported in the MBTI Manual (Myers, McCaulley, Quenk, & Hammer, 1998) and in other research (Levy & Ridley, 1987; Girelli & Stake, 1993; Murray, 1996). Reliability is mainly concerned with the extent to which a measure gives consistent results over time. The concept of reliability deals not only with estimating internal consistency and replicability over time, but also with that part of the variance in reliability estimates that is attributable to the characteristics of respondents (Myers & McCaulley, 1985; Myers, McCaulley, Quenk, & Hammer, 1998). Thus, MBTI reliability is affected by such factors as the gender, age, membership in a minority ethnic group, developmental stage, and achievement level of individuals completing the survey. Assumptions derived from observations made during the construction of the MBTI instrument were that persons with a good command of perception or judgment (i.e., with good type development) are more likely to be clear about their own preferences, and will therefore report their preferences more consistently (Myers & McCaulley, 1985; Myers, McCaulley, Quenk, & Hammer, 1998). Furthermore, since the quality of perception and judgment is often evidenced by an individual's level of achievement, it is expected that in samples of persons of comparable age levels, those with

higher achievement levels will also report their preferences more consistently (Myers & McCaulley, 1985; Myers, McCaulley, Quenk, & Hammer, 1998). Thus, higher reliabilities were found in high achievement samples than in samples of lower achievers.

Reliability data for the MBTI include measures of internal consistency and test-retest reliabilities of the separate scales and type classifications. Split-half coefficients for the MBTI have generally been based on the "logical split halves" formed by Myers & McCaulley (1985), in which the item subgroups of each scale are equally balanced in the *X* half and the *Y* half (McCaulley, 1985). For nine samples of college students, the split-half reliability coefficients reported range from .76 to .88 for E-I (median .81), from .75 to .90 for S-N (median .85), from .68 to .86 for T-F (median .77), and from .80 to .85 for J-P (median .82). For four samples of gifted students, the reliability coefficients ranged from .75 to .94; lower reliabilities were reported for three underachieving samples: from .57 to .81(McCaulley, 1985). Myers, McCaulley, Quenk, and Hammer (1998) reported for scores on the four dichotomous scales of form G of the MBTI, internal consistency in the form of split-half reliabilities, for samples similar to the one used in this study, ranged from .82 and .89. Tzeng, Outcalt, Boyer, Ware, and Landis (1984) reported alpha coefficients (the average of all possible split-half correlations) between .74 and .85. In a review of the MBTI, Mendelsohn (1965) reported internal consistency reliabilities for the scales ranged between .75 to .85, with a low coefficient of .44 occurring for the T-F scale and test-retest correlations of approximately .70 for E-I, S-N, and J-P, and .48 for T-F scales. Johnson (1992) also found, over a 30-month period, high test-retest correlations for all scales except the T-F scale. Carlyn (1977), in an evaluation of the MBTI, stated

that the predicted reliabilities of type categories appear to be satisfactory in six cases where test-retest reliabilities were reported. In those six cases, the proportion of agreement was significantly higher than would be expected by chance (Carlyn, 1977). Carlson (1985) cited two reports that show consistency in the form of test-retest coefficients ranging between .77 and .89. Other findings (Rittig, Ware, & Prince, 1994) indicate that the internal consistency of the four MBTI scales is quite high, whether computed using logical split-half, consecutive split-half, or coefficient alpha, and that test-retest reliabilities show consistency over time (Myers, McCaulley, Quenk, & Hammer, 1998).

The validity of the MBTI is determined by its ability to demonstrate relationships and outcomes predicted by Jung's theory. MBTI theory postulates that persons are different types who the instrument attempts to classify according to the type *they* believe best fits them (Myers, McCaulley, Quenk, & Hammer, 1998).

Numerous studies of MBTI construct validity have been conducted. Carlyn (1977) concluded that individual scales in the MBTI measure important dimensions of personality as postulated by Jung. Several exploratory factor analyses (Tzeng, Outcalt, Boyer, Ware & Landis, 1984; Harvey, Murry, & Stamoulis, 1995; Thompson & Borrello, 1989) have reported results identical to the hypothesized factor structure of the MBTI. These researchers attempted to determine how many higher-level variables (factors, dimensions, and principle components) were required to account mathematically for the variation represented by all the items (Hylton & Hartman, 1997). Providing evidence for the construct validity of the MBTI, these researchers found that the individual MBTI items

corresponded closely to those predicted theoretically by Myers and Briggs. Tischler (1994) reviewed prior factor analytic studies and found their results to be generally consistent with MBTI predictions. The author also conducted a large sample factor analytic study (N =2,143) and reported strong evidence of a good item-scale structure. The author further asserted that the MBTI "is almost factorially pure, its structure appears valid, and its items appear to measure its scales" (p.30).

The MBTI differs from most other personality instruments in that the theory upon which it is based postulates dichotomies (Myers, McCaulley, Quenk, & Hammer, 1998). This aspect of the MBTI distinguishes it from typical trait approaches to personality that measure variation along a continuum. This is important for reliability and validity considerations, as the type-trait distinction leads to quite different meanings for the scores of trait instruments and MBTI preference indexes. Thus, positive correlations of the MBTI with other personality instruments have particular significance.

Several studies correlating the MBTI to other instruments can be found in the literature that report positive correlations (Apostal & Marks, 1990; Carey, Fleming & Roberts, 1989; Karesh, Pieper, & Holland, 1994; MacDonald, Anderson, Tsagarakis, Holland, & Cornelius, 1994). Myers, McCaulley, Quenk and Hammer (1998) summarized representative correlation data from many different samples with a variety of instruments in the MBTI Manual.

Of particular interest is the correlation between the MBTI and Neuroticism, Extraversion and Openness Personality Instrument (NEO-PI). According to Bayne (1997), a critique of the MBTI by [redacted] provides some of the best

evidence of the validity of the MBTI. Costa and McRae (1989), as a part of their program of research to develop and test the trait theory of personality, related the MBTI to the NEO-PI and found positive correlations for the four scales of the MBTI: E-I =.72, S-N = .71, T-F = .45, and J-P = .48 all $p < .001$. The importance of the research on the NEO-PI for the validity of the MBTI rests on the fact that four of the five NEO-PI trait factors are closely correlated to the MBTI preferences (Bayne, 1997). Thus, research on the NEO-PI is research on the four MBTI preferences, which, according to Bayne (1997), supports this aspect of the MBTI's validity (though not its dynamic, typological aspects). In spite of strong correlations, Costa and McCrae (1989) found little reason to support the MBTI's claims of distinct bimodal distributions on the four preferences, arguing instead that the MBTI preferences are merely normally distributed traits. Rittig, Ware, and Prince (1994), who examined the type distributions of a sample of CEO's, found support for the validity of the MBTI. The authors noted that the fact that a sample of highly developed individuals produced the type distribution posited by type theory confirms the validity of dichotomous type preference scores and seemingly renders untenable the assertion that the MBTI factors are really normally distributed traits.

Murray (1990), in a review of research on the reliability and validity of the MBTI as a psychometric instrument, as an expression of Jung's typology, and as applied in nonpsychiatric populations, concluded that the MBTI's indices of reliability and validity have been judged acceptable, and the constructs underlying the MBTI have been supported by correlations with other measures. Thus, the instrument has demonstrated acceptable levels of validity and reliability for use in this study.

The MBTI is concerned with differences in normal behavior. The Manual describes its objective and how preferences are identified in normal populations:

> The objective of the MBTI is to identify which of two opposite categories is preferred on each of the four dichotomies. The indicator obtains a numerical score based on responses favoring one pole versus its opposite. These calculations are designed not as scales for measurement of traits or behaviors but rather as indications of preference for one pole of the dichotomy or its opposite. The letters E or I, S or N, T or F, and J or P are used to designate which of the opposite sides of a respondent's nature are preferred. The intent is to reflect a habitual choice between rival alternatives, analogous to right-handedness and left-handedness. One expects to use both right and left hands, even though one reaches first with the preferred hand. Similarly, everyone is assumed to use both sides of each of the four dichotomies but to respond first, most often, and most comfortably with the preferred functions and attitudes. (Myers et al., 1998)

The MBTI is based on self-report of the end results of environmental influences and is not designed to identify the extent of these or how they came to produce the effects reported, nor information about defenses or emotional problems (Minor, 1986). That is, the researcher cannot discern from the instrument the quality or degree of perception or judgment development in an individual or a respondent's view of personal deficits. The instrument is normed internationally, boasts several versions, and has been modified to account for cultural differences and gender bias (Myers et al., 1998). The MBTI was developed with adult samples and high school students from middle-class environments who were average to above-average readers.

Data Collection

The first concern was to obtain permission to conduct this study from the university Committee for Human Subjects Research (CHSR). This Office, and its chairperson, as a matter of university policy, grants permission to conduct research involving students on campus. A request to conduct research was delivered to the Chairman of the CHSR, and a positive response was obtained in November of 1998. Supplementary approval was requested from the Fielding Institute's Research Ethics Committee (REC), and a positive response was received from Lin Moses, REC Coordinator, in January of 1999.

I distributed the personal information questionnaire, the consent release form, and a letter of transmittal to each student. The MBTI was administered to 38 active members of Chi Alpha Epsilon (XAE). A licensed psychologist from the University's Counseling Center administered, scored, and interpreted the results of the survey. The university Counseling Center is authorized by the Center for Applications of Psychological Type (CAPT) to administer the MBTI. Participant cumulative grade point average was obtained from the institutional database. Personality type data for the non-developmental student comparison group were retrieved from the Selection Ratio Type Table (SRTT) database obtained from the Center for the Application of Psychological Type.

After each packet of information was returned, the data were coded and the identifying information was removed. A profile of each participant was created. Each participant was assigned a number as a way of organizing the data. I stored this data in a

secure database independent of the institutional database. Students were assured that for all research purposes, any form they submitted remained anonymous.

Data Analysis

One research question was addressed in this study. The question and the statistical treatment used are described below.

The question was: Is there a statistically significant difference between the personality characteristics of high achieving developmental students and high achieving non-developmental students? Once obtained, the data to answer this question were subjected to two types of analyses. The first involved statistical treatment of data obtained from the personal information questionnaire using descriptive procedures. Specifically, the age, gender, ethnicity, enrollment status, and academic major were presented in tabular form.

The second treatment involved chi-square statistical procedures to determine the nature of the relationship between variables. Participant responses to the MBTI were graphically presented on type tables generated by the Selection Ratio Type Table (SRTT) statistical package (Granade & Myers, 1987). The SRTT program compares one type table with another and provides the following information in each block of the table: the name of the type, the number in the type, the percentage of the whole sample in the type, the Index for that type, and a probability statement (McCaulley, 1985). The SRTT analyzed the responses by displaying the statistical difference of the ratios between the sample group and the comparison group established through a series of 2x2 chi-square

calculations with one degree of freedom; if the cell frequencies are 5 or less, the SRTT program computes Fisher's exact probability instead of chi-square (McCaulley, 1985). Thus, the null hypothesis was tested using the chi-square statistic, or Fisher's exact test. Neuman (1994) and Babbie (1998) confirmed that chi square procedures are the preferred statistic when probing for evidence of distribution patterns or relationships.

Comparison group data were obtained from the Atlas of Type Tables (Macdaid, McCaulley, & Kainz, 1986) provided in the SRTT statistical package. The comparison group was drawn from a sample of nondevelopmental students whose cumulative GPA is at or above a 3.0 on a 4.0 scale.

CHAPTER FOUR

Analysis of Data

This chapter presents an analysis of the data collected and is presented in two sections. The first section presents descriptive statistics of the sample population. The second section presents data in which the inferential statistic chi-square was used.

This inquiry focused on a comparison of personality characteristics of high achieving developmental and non-developmental college students. Individuals in both groups were compared on the basis of their responses to the MBTI.

Descriptive Statistics

Thirty-eight undergraduate members of Alpha Chapter of Chi Alpha Epsilon National Honor Society formed the sample group. Form F of the MBTI was administered to each student and hand scored. The 75 members that formed the comparison group included 42 (56%) female participants and 33 (44%) male participants. Comparison group participants were a subset of over 2,500 students who took the MBTI as freshmen and were selected for membership to Phi Beta Kappa for their academic achievement upon graduation. No additional data are available on the comparison group.

The average age of the sample population was 19, with a range of 17 to 23. There were 12 (33%) freshmen, 13 (35%) sophomores, 6 (13%) juniors, and 7 (19%) seniors in the sample population. The mean GPA was 3.34 upon entry into the honor society for the sample group. The minimum entry GPA required for all prospective members of Phi Beta

Kappa is above 3.50. Six (16%) were African American; 6 (16%) were Asian, Pacific Islander; 2 (.05%) were Latino, and 24 (63%) were White.

The thirty-eight members of the sample group who participated in this study included 27 (71%) female and 11 (29%) male respondents. The ratio of females to males in the sample population closely matches the proportion found in the local developmental population, where the ratio of females (70%) to males (30%) is slightly more than 2 to 1.

Of the 16 types reported for the sample group, the most frequent are ISTJ, ISFJ, and ESFJ. For the comparison group, the most frequent are INTJ and INFP. No preference for ESTP and ISFP and ENTP was reported in the sample. Of the dichotomous pairs (E-I, S-N, T-F, J-P), Extraversion (45%) and Introversion (55%) were closely distributed in the sample, while in the comparison group, Introversion (65%) was preferred over Extraversion (35%) by almost 2:1. These data are consistent with previous research that found a relationship between Introversion and academic performance (Myers & Myers, 1980). The Sensing (S) preference accounted for 73% of the sample group, and 24% of the comparison group. It is interesting to note by contrast that 26% of the sample group and 76% of the comparison group preferred Intuition (N).

While Thinking (T) and Feeling (F) were closely distributed (48% and 52% respectively) in the comparison group, more Feelers (61%) than Thinkers (39%) were reported in the sample group. Note that Judging (J) and Perception (P) were closely distributed (53% and 47% respectively) in the comparison group, and preferences for Judging (76%) outnumbered preferences for Perceiving (24%) by 3:1 in the sample population.

The Sensing/Judging (SJ) type groups account for 60% of the sample population and 15% of the comparison group. In contrast, the Intuition / Judging (NJ) type groups account for 39% of the comparison group and 16% of the sample. Note also that the Sensing / Perceiving (SP) type groups account for 13% of the sample and 9% of the comparison group. The high percentage of Sensing (S) over Intuitive (N) types in the sample is consistent with the high frequency of this type found in developmental populations as reported in previous research (Spann, Newman, & Matthews, 1991). The preponderance of Intuition (N) in the comparison group is consistent with reports of a strong correlation between this type and performance on standardized tests and high collegiate grade point averages (Van, 1992).

Table 1 displays the number and percentage of dichotomous type preferences with gender distribution. Table 2 presents the percentage of each type occurring in both the sample and comparison groups. Table 3 presents the four-letter type distribution of the sample population. Table 4 presents the sample group declared status by gender. The 38 respondents included 24 (63%) students who reported having declared majors and 14 (37%) students who were undeclared.

The above described data and tables are provided for descriptive purposes and are not central to this study. They are included to aid our understanding of high achieving developmental students and for making assessments about how representative this sample may be. The inclusion of the type data in Table 3 provides an answer to the question: What is the personality type distribution of high achieving developmental students?

Table 1

Sample Population Dichotomous Type Preferences with Gender Distribution

Dichotomous Type Group	N	% of sample	Female	Male
E	17	44.74	11	6
I	21	55.26	16	5
S	28	73.68	21	7
N	10	26.32	6	4
T	15	39.47	8	7
F	23	60.53	19	4
J	29	76.32	23	6
P	9	23.68	4	5

Table 2

Type Percentage for Comparison and Sample Groups

Type	PBK %	XAE%
ISTJ	8.00	18.42
ISFJ	4.00	18.42
INFJ	10.67	2.63
INTJ	13.33	2.63
ISTP	2.67	5.26
ISFP	2.67	0.00
INFP	13.33	5.26
INTP	10.67	2.63
ESTP	1.33	0.00
ESFP	2.67	7.89
ENFP	10.67	0.00
ENTP	2.67	0.00
ESTJ	1.33	5.26
ESFJ	1.33	18.42
ENFJ	6.67	5.26
ENTJ	8.00	5.26

Table 3

Sample Group Personality Type and Gender Distribution

ISTJ	ISFJ	INFJ	INTJ
N = 7	N = 7	N = 1	N = 1
F 5	F 7	F 1	F 1
M 2	M 0	M 0	M 0
ISTP	**ISFP**	**INFP**	**INTP**
N = 2	N = 0	N = 2	N = 1
F 0	F 0	F 2	F 0
M 2	M 0	M 0	M 1
ESTP	**ESFP**	**ENFP**	**ENTP**
N = 0	N = 3	N = 1	N = 0
F 0	F 1	F 1	F 0
M 0	M 2	M 0	M 0
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
N = 2	N = 7	N = 2	N = 2
F 2	F 6	F 1	F 0
M 0	M 1	M 1	M 2

F = female
M = male

Table 4

Sample Group by Declared Status and Gender

Status	Female	Male	% Of Total
Declared	16	8	N = 24 63%
Undeclared	11	3	N = 14 37%
Total	27	11	100

Results

Appendix B displays the sample group data derived from a comparison of Chi Alpha Epsilon (XAE) and Phi Beta Kappa (PBK) groups in type table format. Type tables were devised to identify relationships among the 16 personality types. Individuals found in specific cells of the table are assumed to have certain preferences in common and hence share qualities associated with those preferences. Thus, it is valuable both for analysis of research data and for systematic observation (Myers & Myers, 1980).

According to the information presented in the type table, the XAE sample group had approximately equal numbers of Extraverts (N =17) and Introverts (N = 21). Feeling types (N = 23) outnumbered Thinking types (N = 15). The greatest difference occurred on the Judging-Perception scale on which Judging types outnumbered Perceiving types 3 to 1. By comparison, the PBK group had approximately equal numbers of Thinking types (N = 36) and Feeling types (N = 39), as well as of Judging (N = 40) and Perceiving types (N = 35).

While 13 of the 16 types were represented in the XAE group, the modal types ISTJ, ISFJ, and ESFJ outnumbered all other cells. There is a clear preponderance of the Sensing-Judging (SJ), Sensing-Thinking (ST), and Sensing-Feeling (SF) type groupings in the XAE group, with Intuitive-Feeling (NF), Intuitive-Thinking (NT), and Intuitive-Judging (NJ) type groups significantly underrepresented.

All 16 types were represented in the PBK group with a clear preponderance of Intuitive-Judging (NJ) and Intuitive-Thinking (NT) type groups. The modal types in the PBK group were INTJ and INFP.

The XAE sample group was compared to the PBK base group using the SRTT statistical analysis software program. SRTT analysis can be used to test how the frequency of a type in a sample compares with the frequency of that type in a relevant base population (Granade & Myers, 1987). To determine the probability that the frequency of a given type occurs by chance, a statistical test is applied to these data, and a contingency table is created that is subjected to a chi-square test. Comparison using the SRTT analysis reveals the type distribution, percentages of type, the number of types, and type groups in the sample. The SRTT program also provides a probability statement in each cell where appropriate. In addition, a symbol (■) is used to convey a visual impression of the frequency distribution of the 16 types (see Appendix B & C). SRTT also provides the self-selection index (I), the ratio of type preferences found in the sample group relative to those in the comparison group. Myers, McCaulley, Quenk, and Hammer (1998) explained:

> The ratio provides an index of the magnitude of over or under-representation of a given type or preference in a group. Ratios that are at 1.00 indicate types that are equally represented in both groups. Ratios greater than 1.00 indicate over-representation of that type, and ratios less than 1.00 indicate when that type is under-represented. Thus, a displayed ratio of 2.00 indicates that about twice as many individuals of that type are found in the sample as

would be expected given the frequency of that type in the comparison group.

Statistical significance of the reported ratios is established through a series of 2x2 chi-square calculations with one degree of freedom.

SRTT analysis revealed the most frequent preferences among the four dichotomous types (E-I, S-N, T-F, and J-P) for the sample group to be: **I**ntroversion (55%), **S**ensing (74%), **F**eeling (61%), and **J**udging (76%). By contrast, the most frequent preferences reported for the PBK group are **I**ntroversion (65%), **I**ntuition (76%), **F**eeling (52%), and **J**udging (53%). Note a clear trend for each group to express Introversion (I), Feeling (F), and Judging (J) preferences. While both groups are similar in frequency percentage, the contrasting trend for the S-N preference is reported, along with the J-P preference, to be statistically significantly different.

The SRTT indicates statistical significance in 18 of 44 comparisons. Of the 18 comparisons, significant differences were presented for 2 four-letter types (ISFJ & ESFJ) and 16 type groups (see Appendix E). When compared to the PBK group, the XAE group was significantly overrepresented in Sensing (Index =3.07 $p < .001$), $x^2 > 10.8$ and Judging (Index = 1.43 $p < .05$), $x^2 > 3.8$, and significantly underrepresented in Intuition (Index = 0.35 $p < .001$) $x^2 > 10.8$ and Perception (Index = .51 $p < .05$) $x^2 > 3.8$. Moreover, XAE had significantly greater proportions of SJ (Index = 4.13 $p < .001$) $x^2 > 10.8$, SF (Index = 4.19 $p < .001$) $x^2 > 10.8$, ES (Index = 4.74 $p < .001$), and EJ (Index = 1.97 $p < .05$) $x^2 > 3.8$, with the main contribution derived from the ESFJ (Index = 13.82 $p < .01$) type group. Finally, there was a clear trend for NT (Index = 0.30 p .01), NP (Index =

0.28 $p < .01$), NJ (Index = 0.41 $p < .05$) x^2 3.8, and IN (Index = 0.27 $p < .001$) type groupings to be significantly underrepresented in the XAE sample.

Type theory postulates that each of the 16 four-letter types describes a specific set of characteristics. Hence, the statistically significant four letter types ISFJ and ESFJ reported for the XAE group are predicted to possess the following characteristics:

- ISFJ types are systematic, painstaking, and thorough; responsible, hard working and practical, detail and fact oriented, adapt excellently to routine, and display depth of concentration (Myers & Myers, 1980).
- ESFJ types are friendly, tactful, expressive of their feelings, value harmonious human contact, anxious to conform to legitimate expectations; are persevering, conscientious, orderly, and possess breadth of interests (Myers & Myers, 1980).

While this analysis has indicated statistically significant differences between the two subject groups on most type dimensions, other type dimensions are notably similar, and thus, share characteristics. For example, the IJ combinations in both groups share the characteristics "depth of concentration" and "organization"; the EF combinations in both groups share the characteristics "breadth of interests" and "warmth and sympathy." The two samples differ significantly in Sensing (S) and Intuition (N) that have the characteristics "reliance on facts" and "grasp of possibilities," respectively, and the Judgment and Perception attitudes that have the characteristics "organization" and "adaptability" respectively.

Type frequency data for the XAE and PBK groups are contained in Appendix B and C respectively. A visual inspection reveals the contrast in type preferences among

the XAE and PBK groups. Of the XAE four-letter type preferences, six Sensing (S) groups, ISTJ, ISFJ, ISTP, ESFP, ESTJ, and ESFJ are overrepresented and seven Intuitive (N) groups, INFJ, INTJ, INFP, INTP, ENFP, ENFJ, and ENTJ, are under-represented (see Appendix B). Three cells, ISFP, ESTP, and ENTP, are vacant. Note that in relative terms, I-types (Index = 0.85) have fewer numbers than expected, and E-types (Index =1.29) have more numbers than expected. However, in absolute terms, there are more I-types (55%) than E-types (45%) (see Appendix B). This information has significance for researchers, or in practical applications, where clarity regarding absolute numbers or relative trends is important (Granade & Myers, 1987).

CHAPTER FIVE

Conclusion and Recommendations

This chapter is arranged in two sections: (a) the findings and conclusions of the study; and (b) recommendations for further research related to this topic.

The purpose of this study was twofold: (a) to identify the personality types of high achieving developmental students to inform developmental program practice, and (b) to compare the personality characteristics of high achieving developmental students with those of high achieving nondevelopmental students. The central aim of this study was to determine if a correlation exists between personality and high academic performance. Individuals in both groups were compared based on their responses to the MBTI.

Findings

The literature reviewed in chapter 2 indicated a need to research high achievement performance of developmental students, especially in terms of personality characteristics, as these characteristics appear to be related to academic performance. These studies have shown that there are differences in how developmental students view and respond to education and learning. This inquiry substantiates these findings. Furthermore, it is apparent from the results of this study that collegiate performance is influenced by factors other than cognitive ability. This investigation has shown that high academic achievement is not limited to students who possess a particular personality type as predicted in the literature. Thus, this research has substantiated previous findings that have shown an effect of personality on collegiate performance. This study corroborates

these findings by identifying the personality types of students who have demonstrated a capacity to perform above expected or predicted levels.

The results of the study indicate that high achievement in college is not limited to a singular group or personality type. This inquiry has shown that while both types (Sensing & Intuitive) of learners are able to reach the same objective, some do so with help and different tools. Figuratively speaking, some students have long legs and take long strides to reach an objective; other have short legs and must take many more steps to reach the same objective. Thus, it appears that existing performance assessments based on traditional measures (i.e., standardized tests) alone tend to disqualify extremely capable students from educational opportunity.

These findings support the use of non-cognitive factors as predictors of developmental student academic performance, and support the use of personality type in instruction and program services for both developmental and nondevelopmental populations.

The following null hypothesis was tested in this study:

HO1 There is no statistically significant difference between the personality characteristics of high performing developmental students and non-developmental students as measured by the MBTI.

This hypothesis was rejected based upon statistically significant results produced by chi-square analysis.

The specific findings of the study are:

High achieving developmental students, as a group, exhibit significantly different four-letter type preferences (ISFJ & ESFJ) from those of the high achieving nondevelopmental comparison group.

1. High achieving developmental students, as a group, exhibit a significantly different mode of perception (Sensing) than the nondevelopmental comparison group (Intuition).
2. High achieving developmental students, as a group, differ significantly in their mental functions. Developmental students are overrepresented in Sensing / Feeling and Sensing / Thinking functions, and are significantly underrepresented in Intuition / Feeling and Intuition / Thinking functions.
3. High achieving developmental students, as a group, differ significantly in the combination of perceptions and orientations to the outer world (Sensing / Judging).
4. High achieving developmental students, as a group, differ significantly in their orientation of energy (Extraversion) and perceptions (Sensing).

Specific unhypothesized findings of this study are:

1. High achieving developmental students, as a group, more frequently prefer an Extraverted (E) orientation of energy. Thus, they tend to look outwardly and focus their energy on people and things.
2. High achieving developmental students, as a group, more frequently prefer a Feeling judgment. Thus, they are attuned to making subjective assessments.
3. High achieving developmental students, as a group, most frequently exhibit a Judging

(orientation to the outside world) preference. Thus, they prefer organization, plans, and decision-making.

Conclusions

The purpose of this study was to identify the personality types of high achieving developmental students to inform developmental program practice, and to compare the personality characteristics of high achieving developmental students with those of high achieving nondevelopmental students. Practitioners who seek to promote academic excellence and holistic growth among developmental students continue to look for ways to better understand them in order to provide services appropriate to their needs. The results of this study provide information that would enhance program design, service provision, and learning conditions for developmental student populations. Previous research on developmental populations has demonstrated that this group tends to possess cognitive characteristics that differentiate them from the general population of college students. The most significant finding of this research indicates that this sample of high achieving developmental students possesses distinctly different mental functions, as defined by the MBTI, than the high achieving comparison group. The Sensing (S) type preference emerged as dominant among this group of high achieving students. This finding was neither predicted nor expected. Colleges have tended to measure academic ability and achievement through the assessment of intelligence. Standardized assessments of ability (i.e., SAT, ACT) and institutional instruction typically favor Intuitive (N) types (Myers & Myers, 1980) which makes this finding particularly

noteworthy. Most would agree that academic achievement requires an exercise of both perception and judgment. MBTI theory postulates that Sensing (S) and Intuition (N) preferences represent separate but equally valid mental functions. It appears that developmental students, despite their entry status and similar to their nondevelopmental peers, are capable of high academic achievement. They simply use different means to achieve the same end. Myers foresaw this possibility when developing the MBTI. She wrote, " Within limits, type development can substitute for intelligence, because average intelligence, fully utilized through fine type development, will give results far above expectations" (Myers & Myers, 1980).

Implications

Previous research has indicated that type theory and MBTI results are useful in a variety of ways in higher education (Myers & Myers, 1980; Godleski, 1994; Kalsbeek, 1986). This study has demonstrated which type preferences are valuable with respect to academic performance. The types described by the MBTI differ in their interests, ambitions, and ways of learning (Van, 1992). Practitioners can use MBTI identification of differences in learning to promote achievement and increase retention. Because type theory posits potential strengths for all types, the results of this study, while providing a means for understanding the contextual biases that tend to discriminate against otherwise very capable students (Myers, McCaulley, Quenk, & Hammer, 1998), also have implications for higher education in general and institutional practices in particular.

The broadest implication for institutions and developmental program personnel is the need to accommodate the learning differences associated with different personality

types. This need can be met through staff development training for academic affairs personnel, faculty, and others with direct contact with students. For example, faculty can be educated about their MBTI preferences and examine ways to enhance teaching-learning interactions. Furthermore, advising and tutoring services can be tailored to individual needs and thus, improve student performance. With the development of sophisticated audio-visual, CD-ROM, and other technological advances in higher education, innovative and creative means of delivering academic services to students on an individual basis is conceivable.

Research evidence indicates that collegiate environments predominately address the learning styles of Intuitive-Thinking (NT) types (Van, 1992; Provost & Anchors, 1987; Myers & Myers, 1980) and thus, disadvantage students of other types. For example, Sensing - Feeling (SF) types may need extra assistance in social adjustment and in organizing themselves, and Sensing-Perceiving (SP) types may especially benefit from help with goal setting and study skills development (Provost & Anchors, 1987). Student awareness of their personality type, and in particular their individual learning style, has been shown to increase self-confidence and improve academic performance (Wambach, 1993; Van, 1992). Early intervention by developmental program staff will facilitate the process of awareness and empower students to take more control over their own learning.

Finally, the results of this comparison between high achieving students who possess different entry characteristics may offer insight into why some students that are qualified fail and others, who are predicted to fail, succeed. Close to 50 of all college students drop out. Traditional measures of cognitive ability, such as standardized tests

and high school grades, are unreliable predictors of collegiate performance regardless of a student's entry status. Personality characteristics provide an additional means to assess' students performance capability by evaluating their willingness to perform. Furthermore, personality characteristics would provide a basis for higher education practitioners to design or enhance services to effectively accommodate the needs of an increasingly diverse student population.

Recommendations for Practice

Based on the results of this study, the following recommendations are suggested for the larger developmental education community.

1. Traditional methods for assessing ability and predicting academic performance are limited; many that are predicted to succeed fail, and many capable students are often excluded from educational opportunity. Thus, it is recommended that institutional admissions practices be modified to take into account the influence of personality on academic performance. Expanding the use of institutional counseling services to engage psychologists in the admission process would provide supplemental means to assess students' willingness and motivation to perform.

2. Based on the results of this study, it is recommended that greater emphasis be placed on personality characteristics as factors in developmental program design and implementation. For example, opportunities for collaborative learning, computer-assisted learning (CAL) and Supplemental Instruction (SI) should be incorporated in developmental programs based on individual student needs.

3. It is recommended from the results of this study that program services be coordinated in a way that will effectively address individual student differences to promote high

academic performance and retention. For example, use developmental counseling, advising, tutoring, instruction, and career development services collaboratively to outline and map each student's academic and career path.

4. It is recommended that developmental program faculty become aware of and sensitized to their own, and their student's, personality type in order to enhance teacher -student interactions.

The following recommendation is suggested for utilization at the institution from which the sample was drawn.

5. Use the data collected for the local institution to initiate a 3-stage action research cycle designed to develop a broad student characteristics profile that will assist in program design, staff development, and enhanced program services.

    - Stage 1: Make dialogue to address the specific needs of individual learners an ongoing process to facilitate program design and implementation. Administrators and staff of the local development program will have thus initiated a comprehensive **planning** stage.

    - Stage 2: Collect essential student data that will assist in building a student characteristics profile. This study of personality type characteristics will fit within this larger context. Specifically, the identification of personality type will be integrated with other data, and thus represent the **action** stage.

    - Stage 3: Data aggregation and interpretation will begin a **reflection** stage and thus facilitate the process of program modification.

Recommendations for Future Research

Based on the results of this study, the following recommendations are suggested:

1. Replicate this study with a larger sample. Generalizations can presently be made regarding the local population only.
2. Conduct a study that would examine the relationship between the personality characteristics of high performing developmental achievers with those of low-performing developmental students to determine if similarities exist between the two populations.
3. Conduct a study that would examine the relationship of personality type to developmental student withdrawal from college.
4. Conduct a study that examines the relationship between individual developmental student differences and institutional environments.

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Appendix A

MBTI Personality Type Descriptions

ISTJ

Serious, quiet, earn success by concentration and thoroughness. Practical, orderly, matter-of-fact, logical, realistic, and dependable. See to it that everything is well organized. Take responsibility. Make up their own minds as to what should be accomplished and work hard toward it steadily, regardless of protests or distractions.

ISFJ

Quiet, friendly, responsible, and conscientious. Work devotedly to meet their obligations. Lend stability to any project or group. Thorough, painstaking, and accurate. Their interests are usually not technical. Can be patient with necessary details. Loyal, considerate, perceptive concerned with how other people feel.

INFJ

Succeed by perseverance, originality, and desire to do whatever is needed or wanted. Put their best efforts into their work. Quietly forceful, conscientious, concerned for others. Respected for their firm principles. Likely to be honored and followed for their clear visions as how to best serve the common good.

INTJ

Have original minds and great drive for their own ideas and purposes. Have long-range vision and quickly find meaningful patterns in external events. In fields that appeal to them, they have a fine power to organize a job and see it through. Skeptical, critical, independent, determined, and have high standards of competence and performance.

ISTP

Cool onlookers--quiet, reserved, observing and analyzing life with detached curiosity and unexpected flashes of original humor. Usually interested in cause and effect, how and why mechanical things work, and in organizing and facts using logical principles. Excel at getting to the core of a practical problem or finding a solution.

ISFP

Retiring, quietly friendly, sensitive, and kind, modest about their abilities. Shun disagreements, do not force their values or opinions on others. Usually do not care to lead but are often loyal followers. Often relaxed about getting things done because they enjoy the present moment and do not want to spoil it by undue haste or exertion.

INFP

Quiet observers, idealistic, loyal. Important that outer life is congruent with inner values. Curious, quick to see possibilities often serve as catalysts to implementing ideas. Adaptable, flexible and accepting unless a value is threatened. Want to understand people and ways of fulfilling human potential. Little concern with possessions or surroundings.

INTP

Quiet and reserved. Especially enjoy theoretical or scientific pursuits. Like solving problems with logic and analysis. Interested mainly in ideas, with little liking for parties and small talk. Tend to have sharply defined interests. Need careers where some strong interest can be used and useful.

ESTP

Good at on-the-spot problem solving. Like action, enjoy whatever comes along. Tend to like mechanical things and sports, with friends on the side. Adaptable, tolerant, pragmatic; focused on getting results. Dislike long explanations. Are best with real things that can be worked, handled, taken apart, or put together.

ESFP

Outgoing, accepting, friendly, enjoy everything and make things more fun for others by their enjoyment. Like action and making things happen. Know what's on and join in eagerly. Find remembering facts easier than mastering theories. Are best in situations that need sound common sense and practical ability with people.

ENFP

Warmly enthusiastic, high-spirited, ingenious, imaginative. Able to do almost anything that interests them. Quick with a solution for any difficulty and ready to help anybody with a problem. Often rely on their ability to improvise instead of preparing in advance. Can usually find compelling reasons for whatever they want.

ENTP

Quick, ingenious, good at many things. Stimulating company, outspoken and alert. May argue for fun on either side of a question. Resourceful in solving new and challenging problems, but may neglect routine assignments. Apt to turn to one new interest after another. Skillful in finding logical reasons for what they want.

ESTJ

Practical, realistic, matter-of-fact, with a natural head for business or mechanics. Not interested in abstract theories; want learning to have direct and immediate application. Like to organize and run activities. Often make good administrators; are decisive, quickly move to implement decisions; take care of routine details.

ESFJ

Warm-hearted, talkative, popular, conscientious, born cooperators, active committee members. Need harmony and may be good at creating it. Always doing something nice for someone. Work best with encouragement and praise. Main interest is in things that directly and visibly affect people's lives.

ENFJ

Responsive and responsible. Feel real concern for what others think or want, and try to handle things with due regard for other's feelings. Can present a proposal or lead a group discussion with ease and tact. Sociable, popular, sympathetic. Responsive to praise and criticism. Like to facilitate others and enable people to achieve their potential.

ENTJ

Frank, decisive, leaders in activities. Develop and implement comprehensive systems to solve organizational problems. Good at anything that requires reasoning and intellectual talk, such as public speaking. Are usually well informed and enjoy adding to their fund of knowledge.

Source: Myers, I. B., McCaulley, M. H., Quenk, N., & Hammer, A. L. (1998).

Appendix B

XAE Honor Society Type Distribution

$N = 38$ ■ = 1% of N

ISTJ N = 7 % = 18.42 I = 2.30 ■■■■■■■ ■■■■■■■ ■■■■■■■	ISFJ " N = 7 % = 18.42 I = 4.61 ■■■■■■■ ■■■■■■■ ■■■■■■■	INFJ N = 1 % = 2.63 I = 0.25 ■■■	INTJ N = 1 % = 2.63 I = 0.20 ■■■
ISTP N = 2 % = 5.26 I = 1.97 ■■■■■	ISFP N = 0 % = 0.00 I = 0.00	INFP N = 2 % = 5.26 I = 0.39 ■■■■■	INTP N = 1 % = 2.63 I = 0.25 ■■■
ESTP N = 0 % = 0.00 I = 0.00	ESFP N = 3 % = 7.89 I = 2.96 ■■■■■■ ■■	ENFP N = 1 % = 2.63 I = 0.25 ■■■	ENTP N = 0 % = 0.00 I = 0.00
ESTJ N = 1 % = 5.26 I = 3.95 ■■■■■	ESFJ # N = 7 % = 18.42 I = 13.82 ■■■■■■■ ■■■■■■■	ENFJ N = 2 % = 5.26 I = 0.79 ■■■■■	ENTJ N = 2 % = 5.26 I = 0.66 ■■■■■

Note:
" Implies significance at the .05 level
Implies significance at the .01 level
* Implies significance at the .001 level
_ Underline indicates Fisher's exact probability used instead of chi-square

Appendix C

PBK Honor Society Type Distribution

$N = 75$ ■ = 1% of N

ISTJ	ISFJ	INFJ	INTJ
N = 6 % = 8.00	N = 3 % = 4.00	N = 8 % = 10.67	N = 10 % = 13.33
ISTP	**ISFP**	**INFP**	**INTP**
N = 2 % = 2.67	N = 2 % = 2.67	N = 10 % = 13.33	N = 8 % = 10.67
ESTP	**ESFP**	**ENFP**	**ENTP**
N = 1 % = 1.33	N = 2 % = 2.67	N = 8 % = 10.67	N = 2 % = 2.67
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
N = 1 % = 1.33	N = 1 % = 1.33	N = 5 % = 6.67	N = 6 % = 8.00

Appendix D

MBTI Type Groups

N=38 I = Self-selection ratio % = percent of sample

Dichotomous Preferences

	N	%	I	
E	17	44.74	1.29	
I	21	55.26	0.85	
S	28	73.68	3.07	*
N	10	26.32	0.35	*
T	15	39.47	0.82	
F	23	60.53	1.16	
J	29	76.32	1.43	"
P	9	23.68	0.51	"

Note:
" Implies significance at the .05 level
Implies significance at the .01 level
* Implies significance at the .001 level
_ Underline indicates Fisher's exact probability used instead of chi-square

Pairs and Temperaments

	N	%	I	
IJ	16	42.11	1.17	
IP	5	13.16	0.45	
EP	4	10.53	0.61	
EJ	13	34.21	1.97	"
ST	11	28.95	2.17	"
SF	17	44.74	4.19	*
NF	6	15.79	0.38	#
NT	4	10.53	0.30	#
SJ	23	60.53	4.13	*
SP	5	13.16	1.41	
NP	4	10.53	0.28	#
NJ	6	15.79	0.41	"
TJ	12	31.58	1.03	
TP	3	7.89	0.46	
FP	6	15.79	0.41	
FJ	17	44.74	1.97	"
IN	5	13.16	0.27	*
EN	5	13.16	0.47	
IS	16	42.11	2.43	#
ES	12	31.58	4.74	*